

1.0 Introduction

1.1 PURPOSE

This drainage master plan is a part of the planning process to be used as a tool by community planners, engineers, and interested parties to evaluate drainage needs in the proposed Florin-Vineyard Gap Community Plan (FVGCP) area. The drainage master plan analyzes the potential impacts of the proposed developments, and identifies the improvements necessary to mitigate those impacts.

This plan analyzes the following conditions:-

- Pre-project conditions based 2004 land use conditions.;
- FVGCP, North Vineyard Station Specific Plan (NVSSP), and Vineyard Springs Comprehensive Plan (VSCP) post-project conditions with Laguna spill;
- FVGCP, NVSSP, and VSCP post-project conditions without Laguna spill;
- FVGCP stand alone conditions.

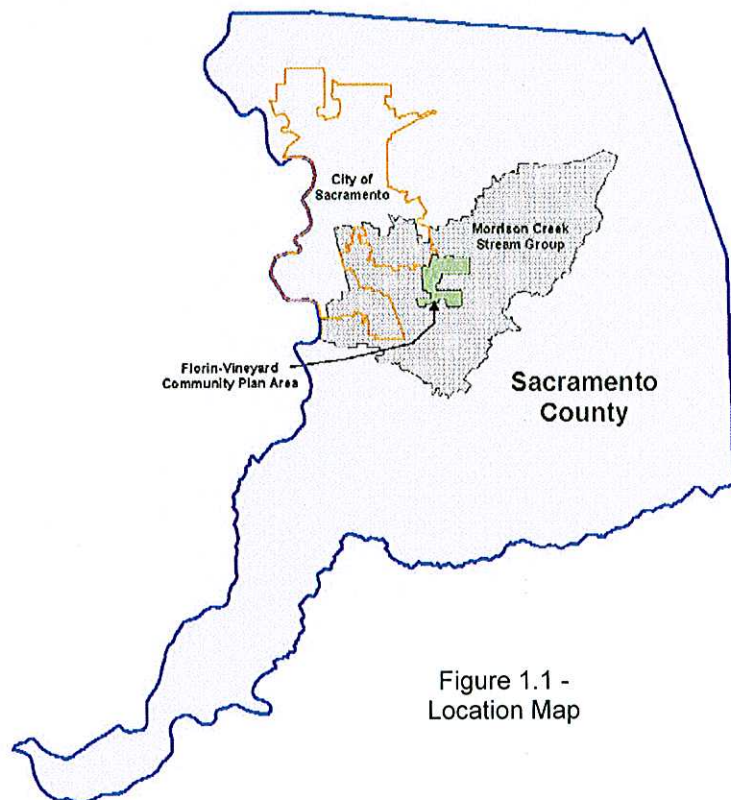


Figure 1.1 - Location Map

The post-project condition with Laguna spill assumes that FVGCP, NVSSP and VSCP are built before Laguna spill is shut off. The post-project condition without Laguna spill assumes that FVGCP, NVSSP and VSCP are built after Laguna spill is shut off. The FVGCP stand alone condition assumes that only FVGCP develops while NVSSP and VSCP remain undeveloped.

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The study are also analyzes in the development of the storm drainage components of the project, including detention basins, water quality treatment facilities, trunk storm drainage, flood control channels. The incorporation of the recommended improvements into the FVGCP will provide flood control and protection to the plan area, and ensure that impacts to peak 100-year flow rates are mitigated to less than the pre-project rates, and that stormwater will be properly treated prior to discharge. Improvements within FVGCP will be constructed by the developers and maintained Sacramento County.

1.2 BACKGROUND

The area included in the FVGCP is a sparsely populated area encompassing roughly 3,876 acres located in the middle portion of Sacramento County. The County's Board of Supervisors initiated the planning process for the area in 1999 and in December of 2003 approved conceptual land use designations for purposes of preparation of an environmental impact report. To be reviewed concurrent with the overall community plan, are 34 distinct development applications that have been filed with the County (Oversize Exhibit IP-2). Oversize Exhibit IP-1 shows the same individual projects with the pre-project floodplain boundary superimposed as requested by Sacramento County Department of Environmental Review and Assessment (DERA). Each application will be required to demonstrate compliance with the master drainage plan prior to improvement plan approval.

In 1999, the Sacramento County Board of Supervisors initiated the FVGCP area planning process, (see Figure 1.1). The Plan provides developers, service providers, planners, and decision-makers a policy document for planning the development within the community.

1.3 PLANNING AND DESIGN CRITERIA

The parameters of the watersheds for the pre-project conditions come from the existing Sacramento County land use as shown in 2004 aerial photographs. The parameters for FVGCP post-project conditions were determined from the land use plan adopted by the Planning Department on December 4, 2003 (Oversize Exhibit LU-1). Oversize Exhibit LU-2 shows the same land use map with the pre-project floodplain boundary superimposed as requested by DERA. Previous efforts by Municipal Services Agency – Department of Water Resources (MSA-DWR) and other referenced work form the basis of this hydrologic and hydraulic modeling. Changes under the Future Conditions model pertain to the following categories:

1. Refinement of drainage sub shed boundaries as they relate to proposed tentative map development and lot configurations.

2. Sizing and alignment of stormwater conveyance systems, including routing of overland release to natural or improved drainage ways.
3. Functionality of detention basins to maintain pre-project peak runoff rates downstream of those basins and the ability to provide treatment to stormwater runoff prior to discharge into the jurisdictional drainage ways.

Each watershed is described by its hydrologic and hydraulic characteristics for pre-project and proposed development. Hydrology quantifies the rainfall runoff generated from the land surface within the FVGCP and is a function of the land surface imperviousness, infiltration rate and capacity, slope, soils characteristics, vegetation and rainfall distribution. Runoff will be collected in storm drainage systems and conveyed to the regional trunk facilities. The runoff will be conveyed through trunk facilities consisting of open channels, piped storm drainage systems, swales and flood control channels. Hydraulic analysis identifies limitations or constraints within existing systems and provides a tool to size proposed conveyance systems to adequately and safely convey flood event runoff to the receiving streams.

1.4 SCOPE OF WORK

The low-lying areas of Sacramento County are susceptible to local and regional flooding due to prolonged heavy rains characterized by high peak flows and large volumes of runoff that occur during the winter and early spring. The potential for local flooding also occurs from short duration, high intensity cloudbursts. As urban growth expands into rural areas and increased impervious surfaces accelerate runoff and generate additional runoff volumes, the potential for increased flooding occurs. This report will document computer models which estimate the system response to the estimated flood events. The computer models also can estimate the impacts which the proposed development would have on the existing watershed, downstream and upstream of the project.

Stormwater detention facilities ensure that the increased future peak flow rates do not exceed the receiving creek's pre-project peak flow. To comply with regulatory and clean water issues, water quality treatment facilities are to be provided either on an individual development basis or within the regional stormwater detention facilities of the plan.

Guidelines established as drainage goals within the proposed FVGCP include maintenance or enhancement of the channel flow characteristics of existing creek channels and providing 100-year flood protection within the channel open space corridors.

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Hydrologic models are used to determine a quantitative estimate of the runoff flow rates that the FVGCP area will discharge for the design storm events (100-year for regional hydrology). Impacts resulting from the proposed changed land use conditions are also evaluated. These models provide a tool to determine and evaluate potential areas of flooding, increased peak flow rates, increased water surface elevations, and provide the engineer a basis upon which to recommend improvements to mitigate and attenuate that flooding to meet Sacramento County Municipal Services Agency Department of Water Resources (MSA-DWR) criteria.

The FVGCP is located within the jurisdiction of the County of Sacramento. The drainage and surface water runoff analysis will be reviewed by MSA-DWR. All new developments and drainage improvements within the County are required to follow specific guidelines in design, rehabilitation, and maintenance of drainage facilities and natural waters as set forth by MSA-DWR. The County of Sacramento emphasizes protection and preservation of the inherent value of a natural stream. Additionally, the County's General Plan and Drainage Master Plan Program requires that no adverse downstream impact shall occur due to development. This is achieved by ensuring that the proposed improvements result in no water surface increases outside of the plan area upstream and downstream, and no peak flow increases downstream. Other elements for consideration revolve around public health and safety issues, maintaining compliance with regulatory agencies, and providing the public with aesthetic natural appearing features. Additionally, dual use facilities including parks (active and passive) and trails are encouraged. The FCVP drainage master plan is an integrated part of the overall regional FVGCP plan.

Stormwater runoff from developing areas is a major focus, especially where historical flooding is known to occur. The environmental value of the existing creek systems are weighed against the flood control needs. In some cases, the existing creek system is of sufficient depth and capacity that flood control can be satisfied without modification. In other cases, additional flood control facilities are added with minor modifications to the creek. In still other circumstances, where there is no intrinsic value to the creek or it is impractical to leave the creek channel intact, a new flood control channel may be proposed to increase flood control capacity, the drainage system discharge depths, and the environmental and esthetic values.

Within development areas minor flow events such as the "Nolte" or 10-year event will be piped, while excess flows will be conveyed via overland release, primarily in streets or along other overland or channel release paths.

1.5 DESIGN CRITERIA

All criteria used and the analysis performed for this master plan are in accordance with the "Hydrology Standards, Volume 2 of the Sacramento City/County Drainage Manual", dated December 1996.

1.6 DESIGN EVENTS

A design event of a 100-year recurrence interval was used to evaluate the watershed impacts, regional hydrology and stream flow hydraulics.

For Trunk Storm Drainage System evaluations, the "Nolte" flow was used to size facilities. For systems which intersect, or parallel arterial roadways, the 100-year event was also evaluated to verify that flooding of the arterial roadway would not occur in the 100-year design event.

For the systems which were analyzed using the CS DRAINAGE STUDIO software, the "Nolte Charts" methodology was used to develop watershed flow rates.

For the systems which were analyzed using the XPSWMM software, SACCALC software was used to generate the inflow hydrographs with HEC-1. The hydrographs were exported by SACCALC to XPSWMM "xpx" format files for input into the XPSWMM models.

1.7 STUDY TEAM

Civil Engineering Solutions, Inc. (CESI) was requested to participate with Mackay and Somps in the preparation of this document in 2004. In 2005 CESI took over the finalization of this document.

Original studies were prepared by Mr. Doug Hamilton, P.E. (consultant to MSA-DWR). He initially developed many of the UNET models that have subsequently been used and modified by others over the years. The latest version of the Elder-Gerber stream group HEC-RAS base model, for the pre-project condition, was developed by CESI. At the time of the writing of this document, a Letter of Map Revision (LOMR), based on the CESI base model, had been submitted to FEMA and was nearing completion.

The hydrologic and hydraulic analyses for the FVGCP study (this document) were prepared by Civil Engineering Solutions, Inc. (CESI).

1.8 ACKNOWLEDGEMENTS

CESI wishes to express it's appreciation to George Booth, Pete Hall, Heidi Huber and Mike Johnson of the Sacramento County Municipal Services Agency Department of Water Resources for their invaluable assistance and suggestions during the development of this study.